

Medical School Hotline

Indigenous Ways of Healing Guinea Worm by the Soninke Culture in Mauritania, West Africa

**M. Scott Hickman, Medical Student II,
John A. Burns School of Medicine,
University of Hawaii,
and Deborah Miller, Documentary Film Maker,
Honolulu, Hawaii**

Editor's Note by Dr. Satoru Izutsu, Editor of the Medical School Hotline: Scott Hickman is a second year student at the John A. Burns School of Medicine. He was accepted for admission to the School in the Fall of 1998; at his request, he was granted a one-year "delayed matriculation" to participate in completing a film documentary on the Dracunculiasis medinesis in Mauritania, West Africa. He began his medical studies in 1999. This article is an example of the rich diversity that students bring with them in becoming physicians...

Introduction

Dracunculiasis medinesis is a nematode that will hopefully soon share the distinction with smallpox of being completely eradicated from the face of the earth. In 1986 there were an estimated 3.2 million cases worldwide. After being targeted by the WHO, the Carter Center, and various other organizations, this number has now dropped 97% to only 78,557 cases in 1998.¹ Although its days may now be numbered, it has a very long and insidious past with humanity. The two to three foot worms have been found on the radiograph of a mummified Egyptian girl who died in 1000 B.C.,² and a treatment of the disease appears in *Papyrus Ebers* from 1550 B.C.³ Some think that when Moses was fleeing Egypt, the "fiery serpents" that afflicted them on the Red Sea were Guinea worm. The ancient as well as modern way of healing someone afflicted with the disease, by wrapping the worm on a piece of wood and slowly pulling it out, has been hypothesized to be the symbol of modern medicine.⁴ (Figures 1 & 2) Alexander the Great brought it with him to modern day India in 300 B.C., and it was the trans-Atlantic slave trade that brought it to the New World.³ It received its popular name, Guinea worm, from European travelers who in the 17th century witnessed the disease on the Guinea Coast (West Africa).⁵ Its scientific name, *Dracunculiasis medinesis*, or the "Little Dragon of Medina" comes from being considered historically the scourge of the Islamic pilgrimage.⁶

My first introduction to the disease came as a Peace Corps Volunteer in Mauritania, West Africa from 1993-1995. I had left the village I was living in, Hassi Chaggar, right before the rainy season with its typical health problems of malaria and diarrhea abundant. I returned one month later to find hundreds of people in the village who could not walk more than 10 feet at a time, with small white worms coming out of their skin and large secondary bacterial infections accompanying the worm. A few weeks after my arrival, the regional health director was giving me a ride in his air-condi-

Figure 1.— Persian surgeons extracting Guinea worm. This plate is from a monograph about Guinea worm written by a European physician in the 17th century. "*Exercitatio de Vena Medinesi, ad Mentem Ebnsinae sive de Dracunculis Veterum. Specimen Exhibens Novae Versionis ex Arabico, cum Commnetario Uberiori, cui Accedit Altera de Vermiculus Capillaribus Infantum. Augusta Vindelicorum. Impensis Theophili Goebelli,*" Georg Hieronymus Welsch, 1674, 303. Plate taken from: Kean BH, Mott KE, and Adair RJ, *Tropical Medicine and Parasitology Clinical Investigations*, Vol. 2, 1978, Cornell University Press, New York, New York, 413-414.



Figure 2.— The modern symbol of medicine. One of many hypotheses to its origin is that it comes from the technique of wrapping Guinea worm on a stick to extract it.



tioned car (nice rides are prized by Peace Corps Volunteers more than pizza and ice cream in Nouakchott [pronounced "new ox shot"], the capital of Mauritania) and he suggested I do a survey of the whole village to get an accurate idea of how many had fallen to the disease. After three days of canvassing the village, I counted 247 out of 5000 people in Hassi Chaggar had been afflicted, the highest rate at the time in Mauritania. While walking in the stifling heat, (on my last trip there it got up to 138° F by 10:30 A.M. and I did not have the guts to check it at the hottest part of the day) I also saw how indigenous healers cured people with the disease. This technique was much different from what I and modern medicine were teaching them to do.

The Soninke are mostly farmers in the Sahel region of West Africa, and the vast majority are Muslims. With only 50-100 miles separating them from the great sand dunes of the Sahara desert, food and water supplies are at a premium. Being able to work in the fields is critical for a family during the three to four months of the rainy season, for it is only during this time that millet, their staple crop, can be planted and harvested. Unfortunately, this is when Guinea worm strikes, afflicting the able-bodied so that they cannot farm. Children are dually affected, by being inflicted themselves or pulled out of school to work in the fields to take the place of a parent with the disease, causing a significant loss of time in school.⁷ Guinea worm does not just affect the health of a community, but has an impact on the economic and nutritional status of a village as well.

Overview of the Life Cycle

Dracunculiasis is contracted by drinking water contaminated with small crustaceans (*Cyclops*) infected by the larval stage of the nematode. (No. 3 & 4 in Figure 6) After ingestion (No. 5 in Figure 6), the Guinea worm larvae penetrate through the stomach and small intestine and enter the retroperitoneal cavity where they mature. The female mates and develops, and then makes her way painlessly mainly to the lower extremities moving through connective and lymphatic tissue.⁸ The female's full size is about 1 meter in length, (almost all of it uterus to carry its million of larvae) and 0.2 cm in diameter.⁹ About one year after initially ingesting the larvae, when the rains come again, a very painful blister is formed by the female worm (No. 8 in Figure 6). Although the worm usually is found in the lower extremities, it can be found anywhere on the body such as the scalp, eyes, scrotum, vagina, spinal cord, etc. Multiple infections are common, and some people may contain from 15 to 30 worms.⁶ When the blister is placed in water, which helps in reducing the pain, it bursts and the female deposits thousands of larvae into the water (No. 1 & 2 in Figure 6). The *Cyclops* again ingest the larvae, and the larval-infected *Cyclops* are then swallowed by humans continuing the life cycle.

Humans are the only host for Guinea worm, making its eradication feasible. Simply by filtering the water with a cloth will capture the *Cyclops* so that ingestion does not take place. Under the leadership of the regional health director and UNICEF and in conjunction with local leaders, my main job in the Peace Corps was teaching how the life cycle of the disease to the Soninke and the preventative technique of filtration. Throughout the world this has been a very efficient means of prevention, and in 1998 when I was last in Mauritania there were only 12 cases of the disease in Hassi Chaggar.

Figure 3.— Carrying water to the house from a well in Hassi Chaggar. During the times when water is scarce, some must walk upwards of one mile several times each day from the well to their house carrying water on their head.



Figure 4.— Guinea worm coming out of the leg of a small child, with a string attached to the worm and the leg to keep it stable. The worm is about 10 cm out of the leg.



Figure 5.— A worm coming out just below the knee. This worm was one of five infecting this woman.



Indigenous Healing Methods

There is no cure for the infection, and most patients are incapacitated for 10-11 weeks due to the pain and secondary infections.¹ (Figure 7) The way taught to the villagers by the local health authorities and myself involved wrapping the worm around a matchstick and pulling it out about 2-3 cm per day while keeping the wound clean. The Sonninke claim to have developed a way of turning this long time of disability to less than one week, so that they can quickly be out in the fields working. It was to research this method that the author and Deborah Miller, a documentary film maker now based Honolulu, went to Mauritania in 1998 to make a film on the indigenous ways of curing the disease.

The process begins by inducing a bacterial infection by making 10-30 superficial cuts around the general vicinity where the worm is found. (Figure 8) Sometimes the lesion formed by the worm itself produces such an infection so that this step is not needed. The wound is initially left open, and then covered with leaves such as from the Neem tree. Once there is a sufficient amount of infection, pus, and edema, a hot-metal poker is used to puncture the wound while 5-6 people hold the patient. (Figures 9 & 10) The patient is then encouraged to immediately get up and walk around. Once the pus drains from the wound, the worm is more easily pulled out, probably by losing its adhesions with the connective tissue destroyed by the bacterial infection.

We followed one patient who had the procedure done in the above figures. She was about an 18 year old married woman with 5 worms in her lower extremities. For weeks before she underwent the procedure, she could walk no more than 20 feet at a time and was confined to her house due to her severe pain, especially due to an infection in her left foot. Under the urging of the relatives in her compound, she visited an indigenous healer, or *jarandanna*, and underwent the procedure. She stood up almost immediately after being lanced on her foot in obvious severe pain but walked home. The next day she appeared to be in much better spirits and in much less pain, with most of the original edema gone but the worm still in place. On the second day after the procedure we went back to interview her again, but her relatives told us she had gone to the fields to work and the worm was gone.

I became interested in the Sonninke way of healing Guinea worm because it has been developed to enable one to go back to work more quickly than what Western medicine could do in such a place. It was incredibly horrific to see this done to someone, as well as appearing very dangerous. But, it was indeed just as amazing when these very same people who before could take no more than a couple steps before visiting the healer were out farming only 2 days afterwards. Modern medicine has made incredible strides to help the health of humanity, but here a local means of healing was preferred by many in the village, not only for its economic benefit of allowing people to go back to work quicker, but for its therapeutic effects as well.

The healers understand the danger of systemic infections, contractures, and frozen joints, and have told me of deaths that occurred due to secondary infections by people who did not wish to undergo the procedure. Their lancing they say is a quick way of finally ending a Guinea worm infection as well as draining the secondary infection. The disease was often explained to me analogous to a fight. If you did nothing, sat around in pain, and were afraid of undergoing the procedure, the worm and its infection would eat you and get the best of you and your family. But if you were brave and lanced it and immediately walked around, you could beat the worm and go back to work. While sipping tea one night in Hassi

Figure 6.— The Life Cycle of Guinea Worm. From reference 6.

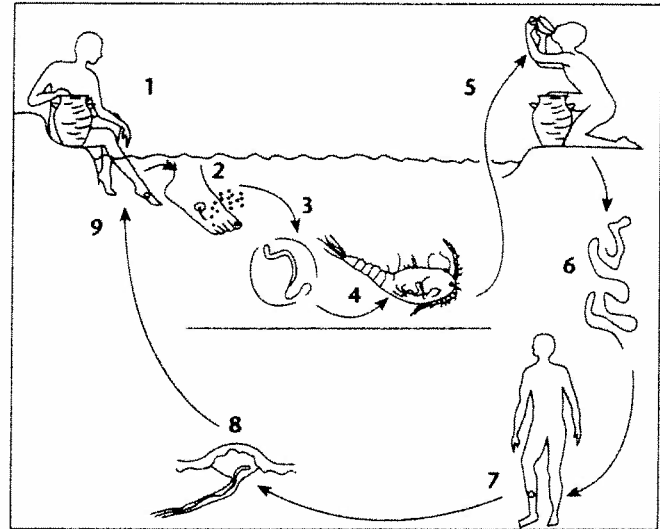


Figure 7.— Using a cane to walk due to the pain of a Guinea worm infection.



Figure 8.— Cutting the skin in the area of the worm. The worm at this point can be palpated under the skin but has not yet bore its way through. Cutting will induce a secondary bacterial infection that probably breaks down connective tissues that the worm normally adheres to.



Figure 9.— No anesthetic is used when lancing the infected area with a red-hot metal poker, so the patient needs to be held down during the process. Lancing the infected area will drain the wound, which the Sonninke claim makes it easier for the worm to come out.



Figure 10.— Lancing the infected area. The poker is in the left hand of the man in the striped shirt, with the coals seen under his left arm. The Guinea worm infection is on the left foot.



Chaggar under the African stars and enjoying the cool of the evening, a Sonninke friend of mine told me that both the available Western and Sonninke methods of extracting the worm were inadequate. One was too slow and the other too dangerous, and both were extremely painful. It makes the final eradication of Guinea worm all that more welcome.

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